35/1 August 1969

Modern conservation systems
Tile outlet terraces; Minimum tillage

Also:
Economic growth in Cherokee Hills
Mountain recreation enterprise

Soil Conservation Service
U.S. Department of Agriculture

Soil Conservation

Devoted to the wise use of land and water resources

Modernizing . . .

Public concern about conservation naturally centers on problem land areas and emerging environmental topics. This month, we turn our attention instead to the agricultural heartland of America, so easily taken for granted.

We invited our field people to report on how conservation farmers there are protecting their soils from the impact of modern technology.

Make way for machines

Conservation Engineer Peter Forsythe describes (p. 4) the modern terrace systems evolved by farmer experience and engineering know-how to make way for large equipment.

Two reports, one by Conservation Agronomists Walter Guernsey and Dentis Colson of Kentucky (p. 6) and the other by John Maddy of Iowa (p. 7), give a sampling of minimum tillage methods used by many farmers to keep the soil covered even while growing continuous row crops.

Economic growth

We continue to get reports of the economic gains that flow from concerted planning for development and use of an area's natural resources.

The pride of local RC&D Committee Chairman Harvey Chase shows through his account, coauthored with SCS Conservationist Allen Moss (p. 11), of the new jobs and income that mark the first 3 years of the Cherokee Hills project.

Volume 35

Soil Conservation begins its 35th year with this number.

COVER: Soybean planter follows immediately after wheat combine in minimum tillage farming in the St. Charles Soil and Water Conservation District, Mo.

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Conservation systems for modern farmers

By R. C. Barnes and B. D. Blakely
Agricultural engineer and agronomist, SCS, Washington, D.C.

Modern conservation measures for farmland not only must reduce soil and water losses but they must make it possible to produce crops with the minimum of labor and the maximum efficiency of machines.

Over half the Nation's cropland is used for row crops and fallow. In several states, these uses make up 70 percent or more of the crop acreage; in many counties they exceed 80 percent. The trend toward larger farms and more tilled crops requires conservation practices that are compatible with modern farming methods and equipment.

Planning a modern conservation system calls for careful attention to the fields within the farm boundary. Field boundaries are usually manmade and consist of a fence or hedgerow which requires turning of farm equipment. Most of them were established long ago when farming was done with horses and mules and plenty of labor. In those days time lost on the turnrow was not so important. It often is necessary to remove such manmade barriers and relocate fences to provide larger fields for efficient farming.

Farmers no longer can tolerate sharp curves in their terraces and contour rows. Multiple hitches, wider equipment, and newer methods of growing crops make it imperative to consider the ease with which conservation measures needed on cropland can be established and maintained.

Landforming or smoothing either before or during terrace construction can aid in installing a more efficient terrace system. In the smoothing operation, low areas are filled and high areas that block row drainage are cut, providing a smooth field throughout the terrace length. This eliminates wet and dry areas and provides for more efficient planting, cultivating, and harvesting.

On steeper slopes, construction of terraces from the downhill side can reduce the land slope between terraces. On deep soils that will permit heavier cuts, some benching of land with construction equipment between terraces may be done.

Whenever possible, terraces should be parallel. This provides an even number of rows throughout the terrace length and eliminates the point rows and odd areas which require turning of equipment.

Terrace shapes are also changing. On moderate slopes terraces are wider with the side slopes designed to fit the width of cultivation and planting equipment. The channels are broad "V's" with sides also of widths to fit equipment.

On steeper slopes terraces with grassed backslopes are becoming popular. The uphill slope is constructed in the usual manner; the downhill one is made steep and planted to grass or hay crops. With modern herbicides, weeds on the grassed backslope can be controlled.

In some areas grassed waterways for terrace outlets are being replaced by buried tile lines running downslope with vertical perforated risers in low spots in the terrace channels. Terrace runoff water enters the risers and moves through the pipe to a safe outlet. The risers are placed in the terrace channel so they can be easily passed by large farming equipment.

Various kinds of minimum tillage may change the need for some of the practices that have long been used. There is plenty of evidence from research studies and farmer experience that minimum tillage reduces soil losses, especially when previous crop residues are left on the surface. Plant growth regulators that suppress cover crops and new equipment that will plant through residues are now available, and better ones will be developed.

In response to new research, new machinery, and new materials, design of conservation farming systems is changing at a rapid rate. ♦

Farmers like their farmability . . .

Tile-outlet terraces

By Peter Forsythe

Assistant state conservation engineer, SCS, Indianapolis, Ind.

The combination of underground tile outlets with parallel terraces has given farmers an answer to one of the troublesome obstacles to conservation farming with modern machinery—the sharp curves and uneven interval widths commonly associated with conventional terrace systems.

So pleased are farmers with the new mode of terracing that in Indiana alone the amount of parallel terraces installed in 1968 was 45 times that of 1965.

Not a new idea

Tile outlets really are not a new idea. They were described and recommended in U.S. Department of Agriculture Bulletin 512, *Prevention of Erosion of Farm Lands by Terracing*, in 1917. Some were installed by CCC conservation camps in 1935, but no real acceptance was gained until the idea was revived in Iowa in the early 1960's.

Farmers like parallel tile outlet terraces for their "farmability." With them, the farmer can have long even rows and flat ridge slopes, so he can crop all of his field with the widest equipment. He no longer has to farm around waterways or raise equipment when crossing them.

When these terraces cross ridges or are built on steep slopes, material to construct them is excavated from the lower side. This reduces the field slope between terraces by a fifth or more. As the terraces are farmed, soil tends to move into the channel area of each terrace, increasing the benching effect.

On slopes of 8 percent or more, the backslope is made narrow and steep and is planted to grass.

Erosion control is the principal reason for building terraces. Any terrace system must be designed to break up field slopes so that soil loss is held within tolerable limits.

On many soils that need terracing, considerable erosion is likely to occur before grassed waterways can be well established. Tile outlets, in contrast, carry water underground to exit channels with no possibility of waterway scour.

A sediment trap

Because of the pooling effect in tile outlet terraces, very little sediment leaves the field. Only the very fine silts and clays, which remain in suspension for hours, are carried to outlets. The offsite sediment reduction benefits, alone, can pay for a terrace system in a few years. Because of this, there is good reason for the Government to share in part of this conservation investment.

Each parallel tile outlet terrace is a small floodwater-retarding structure and must be designed individually as such. A section of the terrace near the outlet is built with a level ridge high enough to provide the required storage, depending on the watershed area above the terrace and the design storm used. The recommended design is to store runoff from a 10-year-frequency 24-hour rainfall plus 25 percent additional volume for sediment.

Designed individually

Because each terrace must be designed individually, a considerable amount of time is spent in the trial-and-error method of computing total storage for various assumed terrace ridge heights until a satisfactory design is achieved. Several labor saving procedures have been considered to extend available SCS manpower for technical assistance.

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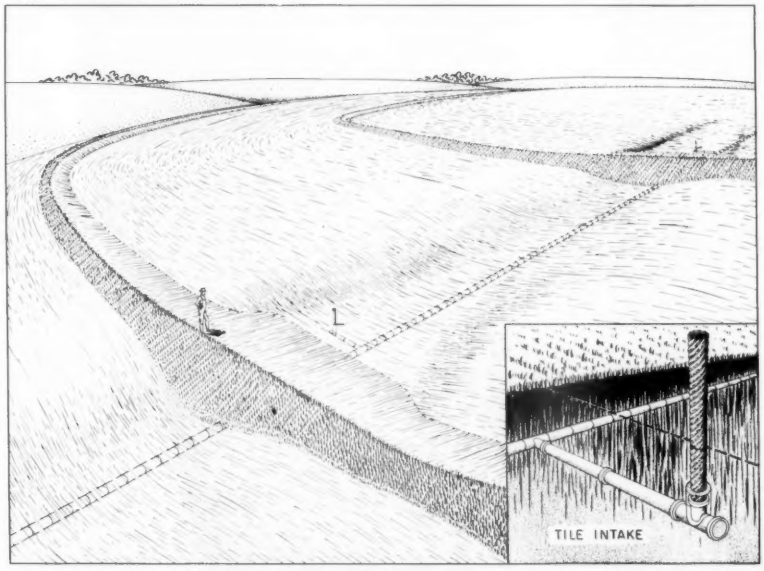


TILE OUTLET TERRACES

The pipe intake to the underground tile outlet (above) is installed in the terrace channel where it will interfere least with rowcrop equipment. An aerial view of the system (right) shows parallel spacing of terraces and traces of tile outlets.

One of the more promising appears to be the use of computers to determine storage and earthwork quantities in design.

In 25 seconds, a computer can provide more information on a terrace system than a skilled technician can calculate in 12 hours. In addition to determining the terrace ridge height, as is done by manual computation, the computer program determines quantities of earth to be moved and adjusts the design to bring earthwork within a desirable balance for good construction.

A valuable bonus of earthwork balancing is that the resulting design provides a minimum volume of fill. For example, the original design for one system of eight terraces had a cut volume of 2,773 cubic yards and fill volume of 7,135 cubic yards. The computer-balanced design called for 6,121 cubic yards of cut and 4,694 cubic yards of fill. Although balanced design cannot be used on every terrace because of soil and site conditions sometimes present, such designs, where applicable, make possible considerable savings in construction costs.

For maximum benefits

The farmer's work is not over when a terrace system is completed. Actually, it has just begun, if he wants to reap maximum benefits from his investment. Small areas where fill material was borrowed and the deeper channel cuts need extra fertilizing and application of organic matter. These areas can be brought back into full production within a few years.

Slopes and layout are such that a farmer can plant and till the terraces and all the area between them. It is important to plan tillage operations to maintain the terrace cross section and avoid dead furrows at the same location every year.

With a well planned and maintained parallel terrace system, a farmer saves fuel and time in farming at the same time he is saving topsoil and fertility on the field and reducing the plague of America's No. 1 water pollutant—sediment. ♦

Blue lupine variety for Southeastern U.S.

A new variety of blue lupine, the first especially bred for winter hardiness, has been released to breeders. Cooperatively developed by USDA's Agricultural Research Service and the Georgia and Florida agricultural experiment stations, the new variety, "Frost," is intended for production in the lower Coastal Plains of the southeastern states.

Many of the hazards to growing lupine in this area should be eliminated by the new variety. It can withstand temperatures almost 10° F. colder than other varieties tolerate. Moreover, its resistance to anthracnose and grey leafspot—the crop's major diseases—promises Frost an important role in the future improvement of livestock and soil programs.

The new variety may be used for late winter and early spring grazing, for hay or silage, or turned under for soil improvement. Also, it can be grown in association with rye and oats. ♦

Minimum tillage for row crops

No-till no-plow, wheel track or slot planting—by whatever name, the many variants of the new way of farming give good yields with maximum soil protection

System gains with corn, soybeans

By Walter J. Guernsey and Dentis A. Colson

Conservation agronomists, SCS, Lexington and Bowling Green, Ky.

Minimum tillage as a way of growing corn and soybeans has overcome the initial skepticism of farmers. Kentucky saw about a half million acres of row crops planted this modern way in 1968.

Minimum tillage can be adapted to many situations and conditions. It can be used equally well by a farmer with a few acres of row crops or by one with several hundred acres.

Many names have been coined to describe local variations of minimum tillage, such as wheel-track planting, mulch planting, crop residue planting, plow-planting, zero tillage, sod planting, slot planting, and others.

Minimum tillage methods for corn and soybeans have been used in Kentucky for some 12 to 13 years. The beginning was slow, but there are always a few farmers anxious to try something new. Of the half million acres last year, some 100,000 acres was planted in established sod, crop residue, and in winter cover crops without prior seedbed preparation.

"No-till" or "no plow" planting is the latest kind of minimum tillage, and it is receiving an enthusiastic reception. It reduces the labor cost, cuts soil losses sometimes as much as 90 percent, and makes it easy to maintain soil tilth.

This kind of minimum tillage is achieved with planters that disturb only a narrow strip of soil over the crop row. Several types of no-tillage planters are available. The width of disturbed soil varies from 2½ to 12 inches.

No-till planting has been successful in sods of Kentucky-31 tall fescue, orchardgrass, timothy, red clover, alfalfa, Korean lespedeza, and various mixtures of these grasses and legumes. Weed control in corn is easiest when the crop is planted in a heavy fescue sod.

Likewise, planting of corn or soybeans in residues of corn, soybeans, small grain, and grain sorghum has been very satisfactory. So also has double cropping of corn, soybeans, or grain sorghum with small grain.

Regardless of the kind of row crop and when it is planted, the use

(*Continued top of p. 7*)

of herbicides is an essential of successful minimum tillage, especially with the no-till methods. The herbicides take the place of cultivation for controlling weeds.

In Hardin County minimum tillage was started in 1962 by a half dozen farmers. These farmers became leaders in the development of new kinds of equipment and in adapting old equipment for minimum tillage use by small farmers.

Robert C. "Bob" Wade, associate supervisor of the Hardin County Soil and Water Conservation District, president of the Hardin County Farm Bureau, and Kentucky's Outstanding Young Farmer for 1968, was one of these leaders. In 1962 Wade planted 15 acres of corn by wheel-track planting in old Kentucky-31 fescue sod.

In 1968 he planted 100 acres by the no-till method and 220 acres by wheel-track. He used herbicides on the no-till fields.

"My no-till corn was the best corn I had, but all minimum tillage yields were close behind, and all were better than those from conventionally planted corn," Wade said.

In 1969 he plans to have 200 acres of no-till corn and 225 acres of wheel-track planted corn, with none planted by the old methods.

James Robert "Bob" Wade (not related to the Hardin County Bob Wade) of Simpson County plants

(Continued to p. 10)

The airplane is an important minimum tillage tool. On opposite page, a plane seeds wheat in a field of standing corn a month before harvest. Below, the resulting crop in February gives complete soil cover among the cornstalks.

Crop residues substitute for grass in rotation

By John K. Maddy

Conservation agronomist, SCS, Des Moines, Iowa

The trend away from grass in rotation with corn is being offset by increased use of mulch tillage for soil protection in the Corn Belt.

A survey in Iowa last summer showed that 1,400 farmers were using some type of mulch tillage and another 3,000 were planting corn in unplowed seedbeds. Farmers using various mulch tillage systems planted nearly a half million acres of corn and soybeans in Iowa in 1968.

Before the present revolution in agricultural technology, Iowa farmers depended strongly on grass and legume meadows to help control soil erosion. Such cropping systems kept weeds, insects, and plant diseases in check and supplied nitrogen to the soil.

Today, nitrogen is cheaper to buy than to obtain by growing legumes. Weeds and insects are usually controlled with chemicals and diseases by planting resistant varieties of crops. Corn and soybeans bring better return in the market than hay and pasture. A farmer without roughage consuming livestock has little reason, except for erosion control, to grow grass in rotation with row crops.

Although the corn acreage has remained fairly stable in Iowa for the past decade, soybean acreage has more than doubled, almost all at the expense of hay and pasture land. The result is to expose more land to erosion by water and wind and allow more rapid deterioration of soil structure.

Experience of many conservation farmers, however, indicates that the large volume of residue left in a high-yielding cornfield after harvest can be used as a mulch to protect the soil.

William G. Harvey, a cooperator with the Emmet County Soil Conservation District, plants between 600 and 700 acres of corn each year. Harvey uses a till-planter which prepares a seedbed in the row as it plants, leaving the residue of last

A chisel planter puts seed, fertilizer, and herbicide in the soil at one operation with minimum disturbance of the residues.

year's crop undisturbed between the rows. This system provides good soil protection for approximately two-thirds of the land during the early growing period when erosion hazard is greatest. The elimination of plowing, disking, and harrowing operations reduces tillage costs by one-half. Yields are as good or better than those obtained by conventional methods.

James Van Gelder near Orange City in northwest Iowa uses a chisel planter that tills the soil without turning it. It leaves residues spread more completely on the surface than most other equipment. A rain in early June last year caused no runoff between his terraces; in the same storm some of his neighbors' terraces overtopped. He planted 300 acres of corn with only 125 hours tractor time, including chopping and disking stalks, application of fertilizer, and planting.

Wes Roeschke near Moville in the Woodbury County Soil Conservation District uses a planter adapted to follow fluted rolling coulters that prepare a very narrow seedbed for each row. This method offers maximum erosion protection by disturbing a minimum area of soil.

Roeschke also used this no-tillage tool to plant in the previous year's residues on terraced land. In 1968, he had no runoff between terraces, and yields were uniform over the entire field. He estimates that he cut his tractor fuel bill in half on 200 acres planted without plowing.

The amount of residues left on the surface and the percentage of a field covered determine the degree of soil protection. Germination may be delayed and early growth retarded, however, during cool, damp seasons on soils slow to drain and warm up. This is often reflected in reduced yields. In contrast, during periods of drought or high temperatures, additional residues conserve soil moisture and improve yields.

Effect of residues on soil loss with continuous corn

Distribution of residue	Amount of residue lb./ac.	Soil loss ton/acre	Rotation equivalent* continuous corn
No mulch (conventional planting)		10.0	
2/3 cover	3,500	5.0	CCCOM
2/3 cover	5,000	3.3	CCOM
2/3 cover	6,500	2.5	CCOMM
90% cover	3,500	3.3	CCOM
90% cover	5,000	2.0	COM
90% cover	6,500	1.0	COMMM

* C = corn, O = oats, M = meadow.

Information compiled by SCS agronomists in the Corn Belt from federal and state research on soil and water losses under different cropping systems indicates that crop residues on the surface after planting can reduce erosion on continuous cornfields as effectively as grass in the rotation.

Wind erosion has been increasing in Iowa in recent years. The increase appears to parallel the increase in acreage devoted to row crops and to be associated with increased soybean acreages in northwest and north central Iowa. Fall-plowed soybean fields suffer more wind erosion than fall-plowed cornfields.

Some farmers are combating wind erosion on soybean fields by delaying plowing until spring. Farmers are encouraged to use a disk, field cultivator, or chisel plow rather than a moldboard plow to prepare seedbed for soybeans.

Cy Houser, a district cooperator near Woolstock, says his soybean land does not seal and form a crust when disked as it does when plowed. In 20 years of using a disk, he has had practically no soil loss by both wind and water because of mulch tillage on his nearly level farm.

New tillage systems present new problems which must be met by new technological solutions. Most Iowa farmers using mulch tillage broadcast phosphorus and potash fertilizer before planting. Most use dry or liquid fertilizer at planting time in addition to other applications.

Application of a herbicide in the row is important with mulch tillage methods. Those who cultivate find the use of rolling disk hillers instead of shovels or sweeps helps prevent trash from collecting around cultivator shanks.

Another advantage of mulch tillage and no-till planting is that unplowed cornfields provide grain during the winter months for many forms of wildlife. ♦

Dryland fields get action in Idaho irrigation area

By Wilfried M. Hasfurther and George C. Welch
Agronomist and soil conservationist, SCS, Pocatello, Idaho

In southern Idaho where most farms are irrigated and most conservation effort has been spent on husbanding the short water supply and protecting irrigable soils, landowners are now tackling the critical problem of erosion on "dryland" cropland.

Unusually severe rainstorms in 1965 raked the dryland fields, caused unprecedented erosion, and spurred a coordinated effort by local soil conservation districts, Soil Conservation Service, and the Agricultural Stabilization and Conservation Service.

To help get work underway, SCS assigned "dryland specialists" to the area staffs through the Power, Portneuf, Oneida, and Madison soil conservation districts. ASCS set aside funds for ACP "special projects" by which groups of dryland farmers could formulate an accelerated attack on conservation needs and receive financial help to get the job done. Conservation districts assigned special "dryland committees" in each district to coordinate the effort.

In the fall of 1965, erosion in the grain crop grew so serious that it forced farmers to harvest their fields up-and-downhill between uncrossable gullies. It took one farmer 4 weeks longer than normal to harvest his crop. Yields, of course, suffered.

Diversion terraces seemed to be one answer to the problem, so farmers and conservationists toured similar lands in Utah where diversions had been tested and evaluated. These people came back determined to see if this practice would add to their conservation arsenal.

Although similar to the terrace systems long proved in the midwest, the diversions have differences owing to variation in the weather pattern of the area. While intense summer storms cause much of the severe erosion that damages the summer fallow land in the wheat fallow system, snowmelt is also a major factor. Heavy snowpacks occurring annually clog terrace channels with drifts that force the water over the tops of the dikes during melting. Because of this snow problem and the broken, uneven terrain, terrace designs had to be radically changed and adapted.

Soil types play an all-important role in diversion design. Soils vary widely—from deep silt loams that soak away excess water rapidly to others with very tight subsoils that take in virtually no excess water. Since these two extremes may be found even in the same field, diversion design must rest on a detailed knowledge of the soils in each field.

In 1965, following harvest, the first diversions were constructed in the Power District west of Pocatello. The following spring's runoff tested them severely. Problem areas were studied and solutions planned. In 1966, the idea spread to other dis-

Diversion seeded to dwarf intermediate wheatgrass.

Field south of Pocatello after conservation treatment suffered only slight damage from heavy winter runoff in 1969.

tricts in the dryland farming area.

In addition to diversions, strip-cropping, fall tillage, contour farming, stubble mulching, and minimum tillage are needed to reduce soil movement between the diversions, slow runoff, and hold down maintenance in the diversions and outlets.

The results of the coordinated program are now evident throughout the dryland area. More than 130 miles of diversions have been built. They have passed the experimental stage and are accepted throughout the region as a standard feature of the dryland landscape. Some 200,000 acres have been treated to a complete conservation system featuring all the needed practices. Erosion has been demonstrably curbed.

In the area south of Pocatello, county commssioners have spent many thousands of dollars annually to maintain a highway running at the base of the dryland foothills. Flash runoffs used to obliterate the road under a sea of mud and rocks at every heavy rain or snowmelt. Despite several severe summer storms that lashed the region in 1968, the county reports no road repairs were needed.

All the commissioners are enthusiastic in saying that the conservation effort is a tremendous benefit to the taxpayers of the county. ♦

Up to 200 tons per acre of soil loss was typical of the area in 1965. This is part of the same field shown on opposite page.

System gains with corn, soybeans

(Continued from p. 7)

his soybeans and small grain in a double-cropping system. He no-tills his soybeans in 20-inch rows in small grain stubble, using wheat, oats, and barley with equal success.

Last year he harvested wheat on June 21. His soybean planter followed immediately behind the combine and finished within 20 minutes after wheat harvest was completed. A herbicide was applied immediately after the soybeans were planted.

On September 12, Wade seeded oats by airplane for winter cover in the soybeans. A month later the soybeans were combined.

"We figure we save $4 an acre when we use no-till," said Wade. "Also, we saved a lot of time in seeding and harvesting by using no-tillage on our soybeans and by airplane seeding our small grain."

In the development years of minimum tillage, farmers have shown their ingenuity in remodeling the corn planting equipment they already owned. At first they could not buy suitable minimum tillage equipment, and besides they had their own ideas on the changes needed in conventional equipment. The most satisfying thing about the remodeled equipment was that it worked and worked well. Much of this equipment is still in use.

In the beginning years, farmers using minimum tillage received help and guidance from district conservationists and conservation agronomists of the Soil Conservation Service. Now the University of Kentucky Agricultural Extension Service and the Soil Conservation Service both are working to advance the use of minimum tillage.

Kentucky farmers believe that the no-till methods of planting with correct use of herbicides are revolutionizing row crop farming more than anything else since the introduction of hybrid corn. ♦

A matter of payrolls and bank deposits...

Resource project spurs economic growth in Cherokee Hills area

By Harvey F. Chase, Jr., and Allen R. Moss

Chairman of the Cherokee Hills RC&D Executive Committee and SCS project coordinator, Tahlequah, Okla.

A multicounty resource development effort in 3 years has brought 666 permanent jobs to a 3-county area in northeastern Oklahoma and boosted the gross annual income more than $4¼ million.

The Cherokee Hills RC&D Project was authorized for operations in July 1966. Since that time issuance of building permits has been increasing. Sales tax revenue in the area is up, bank deposits have almost doubled, and industrial payrolls have grown.

The boards of supervisors of three soil and water conservation districts —Adair, Cherokee, and Delaware counties — formed the Cherokee Hills RC&D Council which gained approval in November 1965 for planning assistance from the Department of Agriculture. The project work plan now contains 184 project measures.

The economy in the project area is definitely on the move.

Jack Ross, Tahlequah mayor, tells of the confidence residents have in their area. "The city of Tahlequah is presently experiencing an annual growth rate of 11 percent." This reverses the national trend of declining populations in rural areas.

"Another good growth indicator," says Ross, "is the fact that the city has issued $1,200,000 in building permits during the last 13 months."

Sales tax revenues serve as a barometer of economic trends. Records show that sales tax revenues are up 41 percent in the area as compared to a corresponding period in 1962.

Increased construction has not been limited to the towns in the project. Frank Hornett, executive director of the Housing Authority for the Cherokee Nation of Oklahoma, ex-

Better utilization of forest products is resulting in increased income in the project area. This firewood is being loaded for sale in the treeless panhandle of Texas.

RC&D project measures include diverse activities as training bulldozer operators (above) and constructing dipping vats (left) for tick control research of benefit to the cattle industry.

plains, "We are in the process of building 400 new homes for Cherokee Indians. Fifty-six have already been completed. These homes have three and four bedrooms and are valued at an average of $12,000 each. This work constitutes more than a $4 million building program."

Two of the seven banks in the project area and one savings and loan office report that resources totaled $30,844,087 as of April 30, 1969, compared to $12,600,000 on the same date in 1964.

Tourist trade

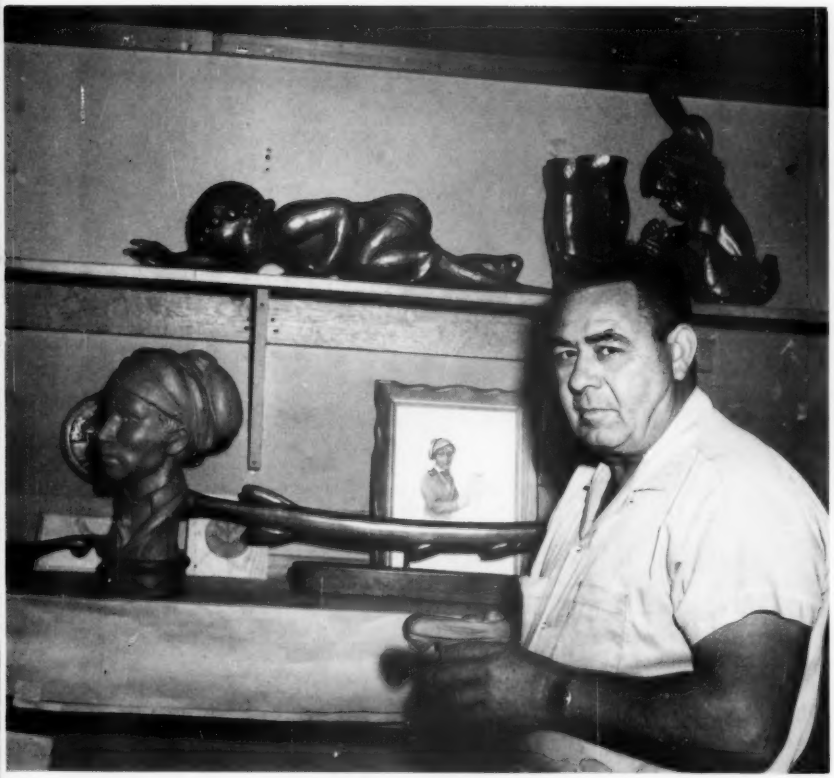
The RC&D Project area is getting its share of increased recreation business. Al Williams, manager of an area grocery, reports, "The recreation and tourist trade between Memorial Day and Labor Day has increased the weekend volume at my place of business by 30 percent."

The beef cattle industry is another segment of the economy being stimulated by resource development. Increased pasture establishment, tick control research, and improved management of both pastures and cattle herds are all included in the effort.

Carl Greenhaw, co-owner of the Tahlequah Community Sale Barn, thinks improvements in the cattle industry are paying off. "We ran about 20 percent more cattle through our auction in 1967 than in 1964, and the quality of these cattle is definitely up," Greenhaw said.

As the development of natural resources receives more attention, the

Improved quality and increased production of cattle result from the accelerated technical assistance, cost sharing, and loan programs available to farmers.



The RC&D project promotes Indian arts and crafts. Willard Stone displays his wood carvings. Construction (below) on watershed projects has resulted in 306 man-years of employment.

industries and businesses that process and sell the products of the land also prosper. The largest resource-based concerns in the area are poultry processing plants, wood products plants, nurseries, and canning companies.

Richard O'Brien, manager of O'Brien's Hillbilly Fryer Poultry Processing Plant at Jay, points proudly to his company's recent expansion. "Our new plant at Southwest City, Mo., 2 miles across the Delaware County line, employs 145 people. This plant and the plant at Jay employ a total of 290 people. We've doubled our plant capacity in this area in the last 4 years."

Water supply

A multiple-purpose reservoir constructed as part of a Public Law 566 project provides flood prevention and municipal water storage for the city of Stilwell. The assured water supply has permitted expansion of the Stilwell Canning Company. Its manager, Claude Todd, says, "Our payroll has gone from $500,000 in 1965 to more than $1,250,000 in 1968. When the sewer system we are now working on is completed, we will be able to add another 200 people to the payroll."

The Alabama Charcoal Company is benefiting directly from the work being done on improved utilization of forest products. Raymond Buzzard, manager of the firm, reports the volume of his business has tripled in the last 3 years.

The RC&D Project area is rich in Cherokee Indian history and tradition and is the site of the Cherokee Cultural Center. The four phases of the cultural center program include a Cherokee Village, which has been in operation for two summers; an outdoor amphitheatre; a Cherokee memorial; and the Cherokee National Archives.

When all four phases are completed, approximately 175 Indians will be employed. Marty Hagerstrand, general manager of the Cherokee Cultural Center, reports that about 30,000 people visited the

Cherokee Village, a replica of Cherokee life of about the year 1700, during the first season of operation.

Indian industry

The Cherokee Indian Tribe has also provided leadership in industrial development. Earl Pierce, chairman of the Provisional Authority of the Cherokee Tribe, enjoys telling visitors about the Cherokee Industrial Tract.

"We now have a restaurant, service station, arts and crafts center, and a Bureau of Indian Affairs office located on the Cherokee Tribe's property. Star-Cross Industry is now building its plant on the site. Star-Cross will employ 200 persons when in full operation."

Education levels are being raised in the Cherokee Hills through a broad vocational training program made possible through cooperation and grants of the Departments of Labor and Health, Education, and Welfare. Rural water districts, sewer systems, and water and sanitation programs are providing for a higher standard of living and a healthier labor force.

U.S. and State Employment Service figures show that unemployment rates are down an average of 2.4 percentage points from the level of 3 years ago.

The sponsors are optimistic of the future of the Cherokee Hills RC&D Project. Of 123 project measures activated to date, 38 have been completed, 45 are being installed, and 40 others are being planned. When all 123 measures are completed, it is estimated they will provide 4,956 man-years of employment for installation, and 3,721 years of continuing employment will follow completion. The increase in gross income to this area is estimated as $27.2 million annually.

Federal, state, and local units of government join with private organizations and groups in assisting in the economic development of the project area. The slogan adopted by project sponsors, "Better use of what we have," is becoming a reality. ♦

The past brings new life to old farm in mountain recreation enterprise

By C. Donald Summers
District conservationist, SCS, Beckley, W. Va.

The 19th century has come back to Flat Top Mountain.

Less than 5 years ago, a small 48-acre farm lay abandoned on a plateau of Flat Top, only a few miles south of Beckley, W. Va. Now the farm is a thriving recreation area built around relics of the mountain country's past.

Dating back to pre-Civil War days, the farm has gone through production of farm crops, become idle land covered with poverty grass and running briars, and is now headed for a productive life again as a cooperator with the Southern Soil Conservation District.

"The General Store"

It is fronted by U.S. Route 19-21 and at the back by the West Virginia Turnpike. White plank fences and green pastures add a change in scenery for travelers on both highways. Many turnpike travelers detour to U.S. 19 just to get a closer look at the farm.

To take these visitors back to the days when settlers first made their homes in the hills, Mrs. Nancy Lee Hutchinson opened an old time country store, constructed on a high point of the farm. The specialties are unusual and regional merchandise.

Even the road sign is a relic of the past. An old milk wagon was set up as the welcome sign announcing "The General Store."

Collection of old buggies

Hugh is an avid collector of old buggies. He began reconditioning some of them at the farm. His hobby, along with his son Charles' interest in horses, led to the opening of a livery stable near Nancy Lee's store.

Since then one thing has led to others. Charles began breeding and raising Morgan horses. He and his dad combined the horses and buggies and began offering trail rides to the store customers. Two and one-half miles of trails were built. Following a plan developed with help from the Soil Conservation Service, the Hutchinsons built three ponds, planted trees for both beauty and wildlife cover, cultivated wildlife

Hugh and Nancy Lee Hutchinson in a buggy drawn by a Morgan stallion arrive at old-time country store. Hugh stands by the milk delivery wagon used as a welcome sign.

Two Beckley College students are taking riding lessons as part of the physical education class.

food, and installed draintile in the pasture area.

This island of early Americana includes an outdoor ring for teaching riding. Classes are offered to individuals, and in 1966 nearby Beckley College began utilizing the ring and stables for classes in horsemanship. Located in an area known as the coldest spot in West Virginia, Charles was hampered in teaching the physical education class during the first year. He has now built an indoor ring for use during bad weather.

In 1967, Charles and his wife, Julia, opened the Cool Ridge Day Camp for children between 7 and 15 years old. Activities included archery, badminton, horseback and carriage rides, volley ball, aerial darts, arts and crafts training, and swimming taught by Julia in a heated pool. Five sessions were held and attendance, ranging from 28 to 54 each session, reached 186, much to Charles' pleasure.

Mary Hutchinson, a sister-in-law, taught the arts and crafts classes in a renovated farmhouse that dates back to pre-Civil War days. The setting is a natural for the crafts study with fireplaces and old-time storage cupboards as a background.

The stable contains the usual tack room, feed room, and office as well as shower rooms for men and women. There is also a room for horsemanship classes. It has a picture window overlooking the large pond and the rolling countryside. Inside is a showcase and bar once used by a saloon in Oak Hill when liquor was legal in the state. It now serves as a display case for trophies and riding tack.

The Hutchinsons also cater small barbecue parties for groups. One such party was recently given for the cast of "Honey In the Rock." During the evening each member was treated to a ride in a buggy or carriage which would have been used by them in the historical days portrayed by the drama.

A recreation farm is not an easy business. Charles says, "It requires long hours and constant work. The day begins early and ends late. After visitors leave we still have horses to care for, equipment to clean and mend, and preparations to make for the next day. However, it is an enjoyable life, and we feel we are offering something which is needed in this area." ♦

Fish, fowl, and cows share multiple use of Creole country marshland

By Terry Clement
District conservationist, SCS, Cameron, La.

It's a chilly December morning in the brackish marsh of Cameron Parish, about 7 miles east of Creole, La. The scene is on the 7,000-acre tract belonging to the Mermentau Mineral and Land Company, Inc., of New Orleans. The sound of the brisk northeast wind is interrupted by the roar of motorboats bringing hunters back to camp with limits of mallards, pintails, teal, widgeons, gadwalls, and other ducks; some have limits of blue, snow, and white-fronted geese in their bags.

As the hunters return they pass a long string of high quality crossbred cattle trailing into the marsh. The cattle are on a cattle walkway —a specially designed levee that enables them to get into the marsh and eat their fill of marshhay cordgrass that grows in the same area where the hunters had been.

The marsh is control-burned every 2 to 3 years. Burning the rough grasses opens up areas for wildlife food plants, such as coast cockspur, saltmarsh bulrush, and others, to germinate and grow. Later burnings improve the quality of the cordgrass for cattle grazing.

Grazing and burning also open areas for waterfowl to feed in. Geese are attracted to the young tender grass. Small ponds or lakes within the marsh are resting and feeding

The marshland of the Mermentau Mineral and Land Co., Inc., serves as a multiple enterprise—ducks (above) feed on duck potato; hunter (center) returns from goose shooting; cattle (below) graze the marsh grasses.

Mrs. Richard Tabor, Herbie Legeune, Reggie Murphy, and Monique Tabor are catching the big ones.

areas for ducks, coots, gallinules, and other waterfowl. They feed on the widgeongrass and dwarf spikerush that grow in the water.

In the distance, you hear the engines of the trappers' mudboats as they make their rounds. They are traveling in level ditches which provide travel lanes and open water for furbearers. The lanes go through areas of olney bulrush, saltmarsh bulrush, and other food plants preferred by muskrat and nutria. Traps are placed along the trails.

What is this, a sportsman's, naturalist's, trapper's, and cattleman's paradise? No, but it's pretty close to it. This productive south Louisiana marshland resulted from an idea of the Mermentau Company's president, Edgar B. Stern, his associates, and Rancher D. Y. "Billy" Doland, Jr., to apply the multiple land use principle by developing the area into a top wildlife and cattle producing enterprise.

They became cooperators with the Gulf Coast Soil and Water Conservation District, and the Soil Conservation Service helped to develop a conservation plan. SCS conservationists made a wildlife and range evaluation survey. A system of ditches, levees, and water-control structures was installed in 1963 for use in controlling the salinity of the water coming in from the Gulf of Mexico and to help maintain a favorable water level. Both are necessary to produce desirable natural food plants for cattle and wildlife.

Besides a water-control system the conservation plan called for practices such as cattle walkways, level ditches, proper grazing including seasonal use with the right number of cattle, wildlife wetland development, controlled burning, and brush control.

About 1½ miles of walkways, needed to distribute grazing, have already been constructed; 300 acres of brush (rattlebox) controlled, cost-shared by the Agricultural Stabilization and Conservation Service, and several miles of level ditches installed. More practices are planned.

"We are getting more ducks and geese each year," Stern said. "Last year we had about 120 man-days hunting with full bag limits. We hunt only on weekends. The marsh is now a better habitat for waterfowl and mammals that stay here throughout the year."

"My calf crop has doubled in size since the conservation plan was developed and the water-control system and other conservation practices were put in," Rancher Doland emphasized. ♦

Gates of inlet pipes on downstream side of control structure can be opened to let tidewater into marsh.

Conservation in action...

A blind farmer's tribute to land

Renovating pastures, constructing a pond, and digging drainage ditches are worthwhile accomplishments on any western Kentucky farm. But for J. C. Owen, blind since childhood, they are a tribute to his love of the land, especially his Cumberland River bottom land and hills.

"Most people make a living, but I live on what I make. Sometimes it's a hard way to go," said J. C., a cooperator with the Lyon County Soil and Water Conservation District.

Most farmers can see the results of their conservation endeavors, but J. C. has to listen and feel for them.

"We seeded this pasture in fescue and ladino clover," J. C. remarked as he ran his ultrasensitive fingers through the grass. "The clover is holding good, but it's grazed down now and the cows need to be moved to another field."

His sense of hearing is also uncanny. "I count 14 cows, 13 calves, and a bull in this field," he said. The eye count showed the same.

J. C. and his brother, Chester, who is also a district cooperator and lives nearby, farm their 320 acres together; but J. C. lives alone and does most of his chores as well as his share of work on the farms. At present he is running 27 cows and seven sows in his cattle-feeder pig operation.

Most of his conservation work has been centered around developing and seeding 100 acres of pastures and meadows. He has also constructed 1,000 feet of drainage ditches which are now removing surface water from the lower bottomland fields. A pond has also been constructed for livestock water. The Agricultural Conservation Program helped by cost-sharing the development of his pastures and meadows. —BOYD CHAMPION, *district conservationist, SCS, Cadiz, Ky.*

J. C. Owen and pasture.

Wyoming

Trailer camp serves travelers, hunters

Convalescing from a heart attack, Charley (Bud) Spence noted day by day the hundreds of tourists who sped by on the highway along his property near Shell, Wyo.

Why wouldn't some of them like to stop and camp in Shell Creek Valley not far from the mouth of rugged Shell canyon? he thought. Nearest campgrounds were in Greybull, Wyo., 15 miles away, and on top of the Big Horn Mountains beyond.

A cooperator with the Greybull-Shell Soil and Water Conservation District, Spence began to discuss plans for a trailer and camper court with SCS conservationists who helped him with his soil and water problems.

He installed 400 feet of tile drain, leveled the area, installed a concrete ditch along the side of the field for irrigation water, drilled a well for water supply, and planted grass and trees.

A private enginering firm designed the main campground to handle 50 camper units. A deluxe modern bath house, centrally located, is a welcome sight to weary travelers.

In the first year of operation, the camp served people from Canada and Mexico as well as from many parts of the United States.

During the slack season, Spence keeps busy guiding rock hunters from other areas. He is well acquainted with the geological formations in the Big Horn Basin.

As an added attraction, Spence offers big game and fishing guide service. Many hunters use the campground as a center for their hunting trips in the area.—ROY H. BUCHMEIER, *district conservationist, SCS, Lander, Wyo.*

Charley Spence's Shell Creek camp.

North Carolina

Appalachian program boosts woodland efforts

Forest management in the Rutherford Soil and Water Conservation District, N. C., is getting a substantial boost from cost-sharing made available under the Appalachian Land Stabilization and Conservation Program (ALSCP).

Officials of the conservation district and the Rutherford Watershed Commission, as sponsors of a watershed program on the Second Broad River, determined that forest conservation was one of the principal land treatments needed. ALSCP funds were channeled largely into a 10-year woodland improvement project, now in its fourth year.

Principal woodland practices include tree planting and culling, brush removal, spot planting, weeding, and underplanting.

Crawler tractors clear land with specially designed blades that minimize soil disturbance.

Annual growth rates that were less than 2 percent before woodland improvemnt are now up to 7 or 8 percent in some areas.—H. J. CHERRY, JR., *district conservationist, SCS, Rutherfordton, N.C.*

Nebraska

Neighbors pool efforts to control floods

Twelve good neighbors in the Niobrara River basin are working together to keep Big Springs Creek from becoming a "big river" again.

David L. G. Willats, a cooperator with the Antelope County Soil and Water Conservation District, was the first to stop worrying and start working on the chief threat to his farm in Nebraska. After signing a Great Plains Conservation Program contract in 1965, he encouraged others to share the costs and benefits of flood control.

Three upstream neighbors signed contracts in 1966. By 1968, eight more men in the 20,000-acre watershed had joined them. Four other contracts are being planned with the assistance of the Soil Conservation Service.

But the creek didn't wait for the men to organize. During the past 4 years, it flooded twice, cut Willats' farm in half, and repeatedly damaged roads and bridges. In 1967, bridge repairs alone cost the county $45,000 from one storm.

Willats and his neighbors have built 48 grade stabilization dams and plan to build 36 more with the help of Great Plains cost-sharing, the Agricultural Conservation Program, and private financing. Flood retarding structures and almost 2½ miles of diversions and terraces have been installed.

Owners were already using cropping systems, wind stripcropping and field windbreaks to protect cropland. Since the joint effort began, they have also planted grass and trees in gravelly draws and other problem areas common to the outwash plains around Big Spring Creek.

A driving rain still worries Willats and his neighbors, but they no longer need to imagine the worst.—ROBERT A. CHILVERS, *district conservationist, SCS, Neligh, Nebr.*

Louisiana

Precision land grading modernizes drainage

Sugarcane farmers in Crescent Soil and Water Conservation District of Louisiana improve water management and increase farming efficiency as they modernize outdated drainage systems with precision land grading.

Stan Rodrigue, manager of Goldmine Plantation and the ASCS county chairman, was the first cane grower in St. John Parish to try precision grading. He had seen the practice applied successfully in other parishes. With the help of the Soil Conservation Service he laid out an 11-acre trial field in 1963.

"Bigger blocks in precision graded fields allow me to use six-row equipment and spend less for labor," he says. "Weeds and Johnsongrass are less troublesome, too."

Rodrigue has graded 200 acres to date. He plans to apply the practice on his entire 1,080-acre plantation eventually. Cost-sharing under the Agricultural Conservation Program has given added incentive to this innovator and his neighbors. S. A. THIBODEAUX, *district conservationist, SCS, New Orleans, La.* ♦

Rodrigue and land-leveling equipment.

Vo-Ag boys plant loblolly pines in Appalachia.

Meetings . . .

Conservation frontiers for Conservation Society

Frontiers in Conservation" is the theme of the 24th annual meeting of the Soil Conservation Society of America to be held August 10-13 in Ft. Collins, Colo. The theme alludes to new techniques and accomplishments in conservation.

Some of the major topics to be presented in general session are "Conservation of Resources and Maintaining a Quality Environment," "Atomic Energy and 'Food Factory' Farms," "Conservation and Use of Water Resources," and "Use of Infrared Photography and Satellites for Resource Surveys."

The concurrent sessions include discussions on "Soil and Land Management to Meet Conservation Goals," "Water Resources Utilization and Management," "Wastes in Relation to Agriculture and Forestry," "Outdoor Recreational and Natural Beauty Needs and Opportunities," "Urban-Suburban Conservation," and "Utilization of Land to Meet Future Needs."

Four technical tours have been arranged—a 115-mile trip to Poudre Canyon; a 100-mile trip to Redfeather Lakes; a 61-mile watershed and irrigation tour; and a 15-mile tour of Colorado State University Foothills Research Campus.

Anti-science trend is topic of Biology Institute

The theme of the plenary session of the 20th annual meeting of the American Institute of Biological Sciences will be "Biology and the Anti-Science Trend." The meeting will take place August 17-22 in Burlington, Vt.

For the first time, the American Society of Animal Science and the Poultry Science Association will cosponsor a symposium on "Challenges in Living Systems" under the auspices of AIBS.

A session will also be held on "Education in Biology," and a Refresher Conference on Animal Behavior Studies cosponsored by the Animal Behavior Society and AIBS will take place before the annual meeting.

Symposium on basin research

The International Association of Scientific Hydrology supported by the United Nations Educational, Scientific, and Cultural Organization will hold an "International Symposium on the Results of Research on Representative and Experimental Basins" at Wellington, New Zealand, December 1-8, 1970. Emphasis will be on analysis and interpretation of the research results on the basins (watersheds), rather than on organizing and running the experimental basins.

Host organization is the Royal Society of New Zealand.

Dates and places

August 3-6, National Farm and Power Equipment Dealers Association, San Francisco, Calif.

10-13, Soil Conservation Society of America, Ft. Collins, Colo.

17-20, American Agricultural Economics Association, Lexington, Ky.

17-21, Conservation Education Association, Arcata, Calif.

17-22, American Institute of Biological Sciences, Burlington, Vt.

19-21, Illinois Land Improvement Contractors Association Soil and Water Conservation Show, Benton, Ill.

22-23, The Nature Conservancy, Seattle, Wash.

September

8-10, International Association of Game, Fish, and Conservation Commissioners, New Orleans, La.

10-12, American Fisheries Society, New Orleans, La.

14-16, National Sediment Conference, Washington, D.C.

14-19, American Parks & Recreation Society, Chicago, Ill.

14-19, National Recreation and Parks Association, Chicago, Ill.

14-19, National Conference on State Parks, Chicago, Ill.

14-19, National Therapeutic Recreation Society, Chicago, Ill.

14-19, Society of Park and Conservation Education, Chicago, Ill.

14-19, American Association of Zoological Parks and Aquariums, Chicago, Ill.

14-19, Armed Forces Recreation Society, Chicago, Ill.

21-24, American Forestry Association, Colorado Springs, Colo.

21-25, National Association County Agricultural Agents, Atlantic City, N.J.

22-25, Farm and Industrial Equipment Institute, Boston, Mass.

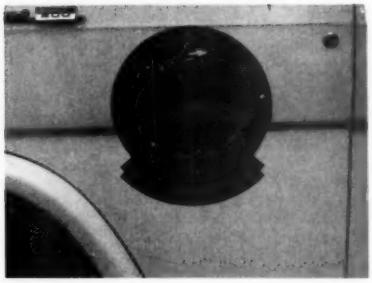
28-October 1, American Bankers Association, Honolulu, Hawaii.

29-October 2, National Association of State Foresters, Portland, Maine

"All this litter and he expects a bite!"
KAB-1

Fish farmers helped by many agencies

Many agencies provide assistance and services to fish farmers. The Soil Conservation Service offers technical assistance in pond and reservoir construction and in fish management. The Farmers Home Administration has a loan program for eligible fish farmers. The Agricultural Stabilization and Conservation Service offers cost-sharing assistance in the construction of reservoirs and ponds that can be adapted to fish farming. The Agricultural Extension Service provides informational and educational materials and services. The state game and fish commissions operate fish hatcheries and can be of help. The Fish and Wildlife Service operates fish hatcheries and a fish farming experiment station where various types of related research are conducted. ♦



"Her soil is her fortune"

The city emblem of Belle Glade, Fla., includes a stylized picture of a farm conservation scene and the legend, "Her soil is her fortune." It appears, among other places, on the sides of police cars. ♦

Grant for water-sewer planning in Nebraska

A grant of $317,080 to Nebraska has been approved by the Farmers Home Administration for comprehensive planning of water- and waste-disposal services in 74 rural counties of that state.

The grant will be administered by the Nebraska State Department of Economic Development.

The grant will assure statewide planning for modern water and sewer systems wherever they remain to be developed in the towns and countryside of rural Nebraska. Fifteen other counties previously have received grants totaling $64,210.

Under the rural water-facilities program of the Farmers Home Administration, comprehensive planning outlines the orderly development of central water systems, sewer systems, and other waste-disposal facilities to serve rural areas including towns of not more than 5,500 population. Planning takes into account the need to insure effective use of water resources, avoid duplication of systems, and locate waste-disposal facilities so as to guard against pollution of water supplies. ♦

Review

People of Rural America. BY DALE E. HATHAWAY, J. ALLAN BEEGLE, AND W. KEITH BRYANT. 1968. U.S. Dept. of Commerce, Bureau of the Census, 289 pp.; maps and charts. $3.50.

An attempt to better define rural America is made in a monograph issued by the Bureau of the Census in cooperation with the Social Science Research Council. *People of Rural America* is the third in a series of analytical and interpretive studies of the 1960 census.

The authors ask the question "What is rural America" and submit that "the entities described by the terms 'rural' and 'urban' have become confused and obscured" and that "it could be a serious error to assume that the sole or even primary function of many rural areas today is agriculturally oriented."

The study points out that in 1960 less than one-third of the population of the 48 mainland states was classified as rural. Within this rural population there were about three rural-nonfarm residents for every rural-farm dweller. A large part of the numerically dominant rural-nonfarm people, because of their varied occupations and residential locations, is inappropriately associated with the term "rural," the authors contend.

The proximity of rural communities to urban centers has had a marked economic and social effect on the rural population; those closer to urban job opportunities have a higher overall income and are more closely associated with urban community life. The growth and increasing importance of urban centers have continued to emphasize the dominance of the urban influence. The authors note that in 1960 more than half of the rural-nonfarm and over a third of the rural-farm population lived within 50 miles of a standard metropolitan statistical area or an area of substantial urban concentration.

Many points amplified in the monograph, comparing economic, social, educational, and other opportunities in rural and urban areas, have long been known. The study offers, however, further valuable insight into the influence, or infringement, of urban life on rural America, and the resultant change in the social and economic structure of the rural population.

The authors suggest a reclassification of the population, dividing the rural category into village and open country for both metropolitan and nonmetropolitan counties, with adjusted population limitations to include more urban concentrations in standard metropolitan statistical areas, as "more descriptive of the residence pattern of the American population."

"It is evident," the authors conclude, "that changed social and economic conditions and needs call for re-examination and change in definitions . . . that . . . recognize the present and future realities of rural America."—JAMES MILLER, *Information Division, SCS, Washington, D.C.*

Natural Areas in Indiana and Their Preservation. BY ALTON A. LINDSEY, DAMIAN V. SCHMELZ, AND STANLEY A. NICHOLS. *1969. Purdue Univ., Lafayette Ind. 594 pp., illus. (No price).*

A carefully documented account of the remaining natural areas in Indiana eloquently makes the point, without actually saying so, of how little remains of the original landscape in our more populous agricultural states.

The authors visited and observed several hundred localities that might have been well enough protected to qualify as true natural areas. Of these, they describe 162 that they feel are worth setting aside as nature preserves. These comprise a little over 14,000 acres in a state that contains 23,226,240 acres.

By and large the 162 locations are scraps and remnants of original con-

ditions, measuring from a half acre to 100 acres or more in size. Only a few are as large as 600 to 800 acres; two contain 1,000 and 1,200 acres respectively.

Bogs, marshes, lakes, dunes, and forest remnants are described. A single 450-acre tract of tallgrass prairie is mentioned in the appendix; this appears to be what is left of the original prairie that may have covered 3 million acres 150 years ago. The location of this area is not given; undue publicity, the authors feel, might result in making the tract difficult to acquire as a preserve.

At the time of publication in April of this year, two of the natural areas were under legal protection of the state. Twenty-nine other tracts are protected by various nonstate organizations. All 31 areas comprise 2,450 acres. This is all.

Do other states do better?—WILLIAM R. VAN DERSAL, *Deputy Administrator, SCS.*

New Publications

Effects of Surface Mining on Fish and Wildlife in Appalachia. BY JOSEPH A. BOCCARDY AND WILLIAM M. SPAULDING, JR. *1968. U. S. Dept. Int., Bur. Sport Fisheries and Wildlife, Resource Publ. 65. 20 pp., illus. $0.35.* Report of a field appraisal team that examined selected areas in eight of the 10 states designated by the Appalachian Regional Development Act of 1965. Team members represented the Bureau of Sport Fisheries and Wildlife, Bureau of Mines, Geological Survey, Forest Service, Federal Water Pollution Control Administration, and the Soil Conservation Service. Observations cover existing conditions, importance to fish and wildlife resources, and accomplishments in restoration for each state. The report concludes that "reclamation as currently practiced in the Appalachian Region does not adequately restore mined lands to minimal standards necessary to protect and improve fish and wildlife resources."

Natural Resources of Maryland. *1969. U.S. Dept. of Int. 54 pp., illus. $0.75.* Twenty-first in a series of reports on the natural resources of the states, this one emphasizes the historical tradition of the Old Line State and the contrasts presented as a meeting ground of the North and South.

Chapters devoted to the history, physical characteristics, fish and wildlife, agriculture and forests, parks and recreation, Indian heritage, and mineral resources of Maryland provide interesting reading for both resident and tourist.

The Forest Service, Soil Conservation Service, U.S. Army Corps of Engineers, and state conservation agencies have contributed to the booklet. Programs of federal natural resource agencies for Maryland are outlined.

Major Uses of Land and Water in the United States With Special Reference to Agriculture. BY H. THOMAS FREY, ORVILLE E. KRAUSE, AND CLIFFORD DICKASON. *1968. USDA Agr. Econ. Rpt. 149, 74 pp.* Continuing the series on the major uses of land and water in the United States published at 5-year intervals by the Economic Research Service, this is the summary for 1964. It gives official statistics on the extent and distribution of land used for crops, pasture and range, forest, and other purposes. Acreages irrigated and dry-farmed, acreages drained, and other information on water-use practices are also included.

Agricultural Utilization of Sewage Effluent and Sludge. BY JAMES P. LAW AND ROBERT S. KERR. *1968 U.S. Dept. of Int., Federal Water Pollution Control Admin. 89 pp. $0.45.* An annotated bibliography.

National Parks and Landmarks. *(1969) U.S. Dept. of Int., National Park Service. 127 pp. $0.55* Two hundred sixty-three areas totaling 28,061,920 acres administered by the Park Service and related properties as of January 1, 1968, are listed and briefly described.

Soil surveys

Ben Hill and Irwin Counties, Georgia. BY JOHN W. CALHOUN AND GARNET J. WOOD. *1969. 63 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by John W. Calhoun, Joe G. Stevens, and Winfield S. Carson.

Cass County, Iowa. BY W. M. JURY, R. I. DIDERIKSEN, AND C. S. FISHER. *1969. 80 pp., illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by W. M. Jury, L. A. Clark, R. I. Dideriksen, J. R. Nixon, I. D. Persinger, M. A. Sherwood, and J. A. Phillips.

Barren County, Kentucky. BY EARLE E. LATHAM. *1969. 85 pp.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Earle E. Latham, Arlin J. Barton, Ronald D. Froedge, and James W. Dye.

Bulloch County, Georgia. BY HERSCHEL L. PAULK. *1968. 75 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by Herschel L. Paulk, Jack R. Brown, and Daniel D. Monts.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS

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NATIVE-BUILT TERRACES WHERE RICE AND TARO GROW, EAST KAUAI SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for $0.10 each or $5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Conservation ever changing

Conservation and conservation concepts are an ever-changing thing in light of new technology and farming methods. Constant vigilance is required to shed the habits of yesteryear and bend with these rapidly changing times

The conservation system designed for the equipment and farming methods of the forties may not meet the needs of today. Farming today is a complex operation. It is based on the best use of efficient machines and scientifically tailored materials to prepare the land, plant, mature a crop, and harvest it with the least amount of scarce labor. Machinery becomes larger, faster, and more expensive. The eight-row planter and cultivator; the giant self-propelled combine; and the large vegetable and fruit harvesting machines require fields and conservation systems which lend themselves to efficient, high speed operations.

A conservation system, even though it may control erosion and runoff, or provide for orderly water management, is not acceptable if it does not provide for efficient use of modern equipment.

Basic principles of conservation learned through the years are still sound. These principles are being woven into new systems of conservation that meet the needs of the modern land user.

Size and shape of fields are being changed to better fit the farming methods. The topography in many cases is altered by land grading. This is done to permit installation of workable erosion control systems; to provide smoother fields for large equipment; to permit more uniform application of water, or more orderly removal of excess water. In some fruit and vegetable producing areas land grading is being performed to provide better air drainage for frost protection.

Adequate access roads and bridges are now an integral part of a conservation system to permit efficient movement of farming equipment and transporting of supplies and harvested crops.

New materials are integrated into conservation systems as they are developed and proved suitable for use. The day of automated irrigation systems is here.

More use of fertilizers on crops and chemicals for insect and weed control are requiring changes in cropping methods and conservation systems. In many places surface water-disposal systems are being placed underground since herbicides and vegetated waterways may not be compatible.

The effect of conservation on improving the quality of the environment is becoming increasingly important. Conservation systems that reduce runoff and erosion simultaneously reduce the movement of sediment and other pollutants into our rivers and lakes.

Many of the standard conservation practices and techniques, with slight adaptation, are playing an increasingly important role on lands used for other purposes. These include such things as control of erosion and sediment from urban areas, management of runoff and by-products from concentrated livestock operations and agricultural processing plants, and control of runoff from eroding road rights-of-way. These all have a place in improving the environment, enhancing esthetic value, and making America a better place for all citizens to work and live.

The modern conservationist and land user must be ever alert and willing to adjust in these rapidly changing times.

Kenneth E. Grant

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Miss Vera Snyder, member of the teaching staff, explains to the children the growth of just a few of the plants donated to the outdoor education school by the SCS Plant Materials Center, Los Lunas, N. Mex.

Children flock to outdoor education Center in New Mexico mountains

About 10,000 elementary school children visited the Outdoor Education Center of the Albuquerque Public Schools during the past school year.

Public and parochial children attend on a rotating basis. The center, located on the east slope of the colorful Sandia Mountains, has a regular staff, and its whole operation is made possible by Federal funds under title 3 of the Elementary and Secondary Education Act.

Although the Albuquerque Public School system administers the center, pupils and teachers from private schools are frequent guests.

Jack Malloy, member of the teaching staff, said, "Our goal is to acquaint the children with the natural environment in the area, see if we can arouse their interest, and make them aware of their responsibilities in relation to the environment."

He was amazed how city children become interested. For example, he said, they are interested in the problem of smog and come to realize that smog respects no political boundaries in its effect on residents.

Malloy described the center program for the children, most of whom are sixth graders.

"It actually involves briefing in the classroom on geology, vegetation, and the effect of man on the area, and best of all a hike into the foothills," he said. "We take the children through canyons and wooded areas and work on the many features we find. We have to guide the children because they could miss things. They are not used to observing."

Some conservationists have found real pleasure in tagging along on some of these tours and listening to the questions and comments.

One of the features of the area is a weather station for measuring wind and precipitation. The center has nature trails and shows examples of good conservation of brush and grass. Some erosion has been left to indicate what should have been prevented. Sometimes there is wildlife—squirrels, deer, chipmunks, and rabbits.

Summer programs are also being planned. Soil Conservation Service conservationists have helped prepare a master plan for the site that tells where various features are and what is needed for soil conservation.

The Plant Materials Center in Los Lunas donated various plants for landscaping and nature trails.

Because of the success of the program, other school systems in New Mexico are planning similar enterprises. ♦

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